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1 Executive Summary

Software is now ubiquitous and an extremely important element in almost any technology and technology based systems. The market demand for quickly produced, reliable yet easily modifiable, globally accessible yet managed and con-trolled software and systems is making a significant demand on the software and systems engineering community. Some of the biggest challenges of ISO/IEC/JTC 1/SC7 are a) ISO/IEC/JTC 1/SC7 standards are often regarded as less relevant to these communities and b) ISO/IEC/JTC1/SC7 is unable to reach these communities and make the significance and relevance of their work known. If we are unable to respond with agility, the subcommittee is at significant risk of losing considerable impact, influence and relevance.

The ISO/IEC/JTC1/SC7 has considered the current market trends and to deal effectively with these needs, has embarked upon certain working group level initiatives as well as the creation of study groups.

2 Chairman’s Remarks

2.1 Macro Trends

Businesses are under significant pressure to “Digitally Transform” themselves. There are many different interpretations of digital transformation but the following underlying themes can be seen in the majority of the interpretations

- Software-ization of everything
- Automation and Internet of Things
- Artificial Intelligence
- Evolution of very large and interacting software platform ecosystems and data sources

These represents software and systems engineering challenge on a grand scale

2.2 Implications

There is a clear shift from IT being used as a support function to a business to becoming part of the core business model, enabled principally through IT. For many sectors, IT is the business.

For many businesses digital transformation is a matter of survival. Agility is needed for in all aspects of business, and there is not a lot of room for inefficiency in the transformation. The key risks that accrue while trying to achieve the transformation are:

- Failure to change in time and on budget – with a significant opportunity loss/ business risk
- Loss of Quality
- Threats to cybersecurity
- Safety
- Lack of ethical concern in the use of Artificial Intelligence (AI)
• Compliance failures

2.3 Market Requirements
The priority areas for standardization for SC7 appears to be

• Modifications of existing standards to incorporate Agile and DevOps in software and systems engineering processes
• Re-packaging of our product line and products to reach a wider audience
• New or revised standards in the acquisition, development, evolution, asset management and sustainment of support of software and systems, including systems of systems and product lines
• Standards for Interoperability and Interfaces between systems
• Standards that are usable by organizations of various sizes
• Standards for engineering of autonomous systems
• Standards for the use of Artificial Intelligence (AI) in Testing and the testing of AI systems

The market requires these standards to be developed on a much shorter time scale. These standards should be implemented with far less overheads than our typical current standard process.

2.4 Study Groups
The following Study Groups have been constituted to provide direction to the SC in light of the identified implications and market needs.

• Study Group for the investigation of standards on quantum computing
• Study Group for the investigation of newer ways to produce standards
• Study group on DevOps and Agile Practices
• Study Group for SC7 Architecture Review
• Study Group for tools and methods for Model Based Software and Systems Engineering (MBSSE)
• Study Group on Specification Techniques Standardization.

Further, SC7 has taken upon itself to create a project for the development of standards for defining a generic framework and terminology for Autonomous Systems.

2.5 Accomplishments
An overview of the existing JTC 1/SC7 collection of standards as of 2017-05-18 can be found in figure 1.
2.6 Resources

The Chair and Secretariat have changed. Several experts have retired. A significant portion of the current work is the maintenance of existing standards base. A lot of the available effort is taken up by this activity. If the sub-committee is to be responsive to the current market situation as it exists currently a focussed effort is required to enlist the right experts.

2.7 Competition and Cooperation

The full JTC 1/SC7 Membership (38 Participating Members and 21 Observing Members, see Fig. 2) list can be found at SC7 Member Listing. SC7 has made a conscious effort to increase co-operation with other standards groups by establishing an extensive network of liaisons both internal and external to JTC 1. A list of liaisons can be found at JTC 1/SC7 Liaisons.

![Figure 1 Overview of the JTC 1/SC7 Standards Collection](image)

![Figure 2 JTC 1/SC7 Membership](image)

Traditionally, JTC1 /SC7 has effective liaison with IEEE Computer Society (IEEE-CS) and the International Council of Systems Engineers (INCOSE). Some new liaisons have been established with JTC1/ WG11 –
Smart Cities, TC 307 (Block chain), TC 279 (Innovation Management) and JTC1/SC42 (Artificial Intelligence). New external liaisons are being created with ITAM.Org, ITAMORG, TagVault and Object Management Group (OMG) to facilitate the programs of working groups.

3 Work Program

3.1 Structure

JTC 1/SC7 Work Program is done in twelve working groups, as illustrated in Figure 3. These working groups operate under a governance structure that is centred on an Advisory Group (AG) and includes the following Special Working Groups:

- SWG1 Business Planning
- SWG5 Standards Management
- SWG22 Vocabulary

![Figure 3 SC7 Structure](image)

3.2 SWG5 – Standards Management

At the 2018 plenary meeting, SWG5 identified potential areas of impact—

- Continuous testing/automation
- No code application development
- AI and robotics effect on engineering
- Data-driven decisions on architecture and design

Many of the items mentioned are already happening and it was agreed that the technology industry is moving faster than the pace of writing standards. The following action plan was agreed:

- Update SD 2 (History) as it pertains to SC 7 according to JTC1 directives.
- Provide input on the Study Group for SC7 Architecture Review
- Develop Strategic Planning Activities
- Create a Standards Diagram and List
- Continue the work of the DevOps and Agile Study Group to continue the work of the Study Group; retained the Chair and members of the SG
- Liaison with ISO/TC279 - Innovation Management - TC279 has items of interest to SC7/WG10.

SW5 deliverables are found at: [http://isotc.iso.org/livelink/livelink?func=ll&objid=9371172&objaction=ndocslis](http://isotc.iso.org/livelink/livelink?func=ll&objid=9371172&objaction=ndocslis)

### 3.3 WG2 – Systems, Software and IT Services Documentation

ISO/IEC JTC 1 SC7/ WG2 has developed a coherent, consistent set of audience-oriented standards, reasonably close to current practice and technology, which will be maintained, revised, and expanded to meet current and future needs.

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WG2 projects (26511, 26514 and 26515), are jointly developed with IEEE. FDIS ballots for ISO/IEC/IEEE 26511 and ISO/IEC/IEEE 26515 have recently completed. The next work items are:

- Revision of ISO/IEC/IEEE 26514:2008 (Design and development of information for users) SG report and Submission for NWIP approval

The latest version of the WG2 business plan and Delhi meeting minute is available at [https://isotc.iso.org/livelink/livelink?func=ll&objId=19767177&objAction=Open&viewType=1](https://isotc.iso.org/livelink/livelink?func=ll&objId=19767177&objAction=Open&viewType=1)

### 3.4 WG4 – Tools and Methods

WG4 future plan has the following components.

- FDIS ballot submission: 3 projects (26553, 26554, 26556)
- DIS ballot submission: 4 projects (26552, 26560, 26561, 26562)
- CD ballot submission: 1 project (23396)
- NWIP ballot submission: 5 projects (26580, MBSSE, S &S, Issue Management., B & D Management.)

The Working group has established a study group to investigate the possibility of a new standard on "Software and systems engineering – Tools and Methods for Model Based Software and Systems"
Engineering (MBSSE)"

The WG4 business plan and business planning documents are available at https://isotc.iso.org/live-link/livelink?func=ll&objId=19748303&objAction=Open&viewType=1

3.5 **WG6 – Software Product Quality and Evaluation**

WG6 decided to setup one year SG within WG6 to investigate possible SQuaRE related NWIs considering current business and technology trend, such as Agile, DevOps, AI, IoT.

The WG6 work program and future plans are illustrated in figure 4.

![WG6 Work Program Diagram](image)

**Figure 4 WG6 Work Program**

3.6 **WG7 – Life Cycle Management**

The principal standards within WG 7 are ISO/IEC/IEEE 15288 (System life cycle processes) and ISO/IEC/IEEE 12207 (Software life cycle processes). A number of elaboration standards have been created on select processes such as ISO/IEC/IEEE 29148 (Requirements Engineering). Much of the efforts within WG 7 are currently revising elaboration and guidance documents.

The latest version of the WG7 projects and documents is available at https://isotc.iso.org/live-link/livelink?func=ll&objId=19768795&objAction=Open&viewType=1. Noteworthy are three projects in the area of System of Systems Engineering (SoS). Also there is an increasing desire of WG7 involvement in the area of DevOps. The WG is keeping track of the related development in IEEE (IEEE 2675 DevOps) and SC7 Study group on Agile and DevOps.

The procedures under the ISO/IEEE PDSO Agreement were discussed extensively and WG7 in conjunction with IEEE, indicated that for the standards involving IEEE, it would make a better effort to recognize it within the NWIPs which start the development process, in accordance with the PDSO.
3.7 **WG10 – Process Assessment**

WG10 has projects, mostly related to the elaboration of the ISO/IEC 330xx family of standards on process assessment. The structure of this family is illustrated in figure 5.

![Figure 5 Structure of ISO/IEC 330xx](image)

The key work items are:

- ISO/IEC 33018 Guide for Assessor Competency
- ISO/IEC 33017 Guide for Assessor Training
- ISO/IEC 33061 Process assessment model for software life cycle processes
- ISO/IEC 33074 Process assessment model for service management
- ISO/IEC 33053 Process reference model for quality management

The latest version of the WG10 business plan is available at [http://isotc.iso.org/livelink/livelink?func=ll&objId=16828410&objAction=Open&viewType=1](http://isotc.iso.org/livelink/livelink?func=ll&objId=16828410&objAction=Open&viewType=1)

3.8 **WG19 - Techniques for specifying IT Systems**

Please refer to SC7 N4305 for an Overview of WG19 ([https://isotc.iso.org/livelink/livelink?func=ll&objId=19472838&objAction=Open&viewType=1](https://isotc.iso.org/livelink/livelink?func=ll&objId=19472838&objAction=Open&viewType=1))

WG19 is currently processing a revision and an addition to the Petri-net standards. There is no new project. A Study Group on Specification Techniques Standardization and to explore the possibility of additional standards or guidance in this area within the program of work of SC7 in software and systems engineering has been established under WG 19. The terms of reference of this study group are:

- Provide an analysis of the requirements of the market and a status of current standardization activities in the area of specification techniques.
- Make recommendations on changes to the current program of work of WG19 (and possibly other WGs) by identifying areas where the creation of new standards or technical reports is desirable.

3.9 **WG20 – Software and Systems Body of Knowledge and Professionalization**

WG20 has four active projects (revisions of parts 1 to 4 of 24773).

It is championing an approved SC7 Study Group on Competency frameworks and models for software and systems engineering professionals.

The latest version of the WG20 business plan is available at https://isotc.iso.org/livelink/live-link?func=ll&objId=19715336&objAction=Open&viewType=1

3.10 **WG21 – Information Technology Asset Management**

WG21 has in its portfolio 19770 series of standards and standards under development are

- 19770-8 Ed.1 Mapping Framework (in DIS ballot)
- 19770-11 Ed.1 Conformity Assessment (to enter CD ballot)

The emerging topics under WG consideration are

- ITAM in IaaS/PaaS
- ITAM in Continuously Updated Endpoint Environments
- Blockchain for ITAM
- Tax and export controls around IT Assets
- Authorization management for ITAM
- IT Financial Management (CapEx/OpEx, reporting, regional requirements)
- Pay-as-you-Go across cloud/hybrid/on-prem
- ITAM Telemetry

WG21 has refreshed its business plan with a new five year tactical view. It is available at: http://standards.iso.org/iso/19770/StratPlan

3.11 **WG24 – SLC Profiles and Guidelines for VSE**

WG24 mandate is to elaborate profiles for Very Small Enterprises from SC7 ‘base process standards’. These are the ISO/IEC 29110 series of standards. This is illustrated in the diagram below:
The WG24 business planning documents are available at https://isotc.iso.org/livelink/live-link?func=ll&objId=17833272&objAction=browse&viewType=1

The plan for next three years is to work on the following items:
- IS 29110-4-4 Agile Software Development - Profile specifications – Generic profile
- TR 29110-5-4 Agile Software Development Guidelines
- IS 29110-4-5 DevOps - Profile specifications – Generic profile.
- TR 29110-5-5 DevOps Guidelines
- 29110-1 Ed 3 (Conv. to IS)
- Profiles for Space Industry

### 3.12 WG26 – Software Testing

WG26 has seven active projects. Its status as of the end of the 2018 Plenary is illustrated in the following figure 6:
The New Work Items include:
- Guidelines for the use of ISO/IEC/IEEE 29119 in Agile Projects
- Collaboration with IEEE on Performance Testing and Incident Management

The latest version of the WG26 business plan is available at https://isotc.iso.org/livelink/livelink?func=ll&objId=19740347&objAction=Open&viewType=1

### 3.13 WG28 – CIF Usability

The joint JTC 1/SC7 ISO/TC54 WG 28 on Common Industry Formats (CIF) for usability reports continue to work on projects identified in ISO/IEC 25060. They appear in the lower right corner of Figure 3.

### 3.14 WG42 – Architecture

WG42 is currently working on three projects in the 420xx suite of standards: Architecture description, process and evaluation.
JTC1/SC7 DASHBOARD

PERFORMANCE INDICATORS - 2014-2018 (Sep)

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STUDY GROUPS

- investigation of standards on quantum computing
- investigation of newer ways to produce standards
- DevOps and Agile Practices
- SC7 Architecture Review
- tools and methods for Model Based Software and Systems Engineering (MBSESE)
- Specification Techniques Standardization.